HEWLETT-PACKARD COMPANY
Intellectual Property Administration
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Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 200312535-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): James O'Neil et al.

Application No.: 10/697,618

Filing Date: October 29, 2003

Confirmation No.: 7287

Examiner: MCDONALD, Rodney Glenn

Group Art Unit: 1795

Title: Method of Forming Thin-Film Electrodes

Mail Stop Appeal Brief - Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF REPLY BRIEF

Transmitted herewith is the Reply Brief with respect to the Examiner's Answer mailed on December 12, 2007.

This Reply Brief is being filed pursuant to 37 CFR 1.193(b) within two months of the date of the Examiner's Answer.

(Note: Extensions of time are not allowed under 37 CFR 1.136(a))

(Note: Failure to file a Reply Brief will result in dismissal of the Appeal as to the claims made subject to an expressly stated new ground rejection.)

No fee is required for filing of this Reply Brief.

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Typed Name: Carla Jones

Signature: Carla Jones

Respectfully submitted,

James O'Neil et al.

By _____

Steven L. Nichols

Attorney/Agent for Applicant(s)

Reg No. : 40,326

Date : January 31, 2008

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Rev 10/07 (ReplyBrf)

DUPLICATE

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Transmitted, herewith, are the following documents:

1. Transmittal of Reply Brief with Duplicate Copy (2 pages)
2. Certificate of Transmission (1 page)
3. Reply Brief (6 pages)

200312535-1 10/697,618

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Patent Application of

James O'Neil et al.

Application No. 10/697,618

Filed: October 29, 2003

For: Method of Forming Thin-Film Electrodes

Group Art Unit: 1795

Examiner: McDonald, Rodney G.

REPLY BRIEF

Mail Stop Appeal Brief - Patents
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Sir:

This is a Reply Brief under Rule 41.41 (37 C.F.R) in response to the Examiner's Answer of December 12, 2007 (the "Examiner's Answer" or the "Answer"). In Section 10, the Answer contains a response to some of the arguments made in Appellant's brief. Appellant now responds to the Examiner's Answer as follows.

(1) Claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32 and 34-36 are patentable over Barnett and Montcalm:

Claim 1 recites:

> A method of forming a thin-film fuel cell electrode, comprising:
> providing a substrate and at least one deposition device;
> *developing a deposition characteristic profile* having at least one porous layer *based on pre-determined desired electrode properties*; and
> forming a film in accordance with said deposition characteristic profile by depositing material from said deposition device while varying a relative position of said substrate in relation to said deposition device with respect to at least a first axis.

(Emphasis added).

As noted in Appellant's Brief, the proposed combination of prior art fails to teach or suggest "developing a deposition characteristic profile ... *based on pre-determined desired electrode properties.*" (Emphasis added). Thus, claim 1 recites a relationship between the deposition characteristic profile and desired "electrode properties" that better enable the film to function as a fuel cell *electrode*. This claimed relationship between a deposition characteristic profile and desired "electrode properties," i.e., "developing a deposition characteristic profile ... based on pre-determined desired electrode properties," is entirely outside the scope and content of the cited prior art.

The Examiner has conceded that Barnett does not teach or suggest a method that includes developing a deposition characteristic profile. (Answer, p. 4). Consequently, the Answer argues that "[t]he secondary reference to Montcalm et al. teach a deposition characteristic profile in the form of a deposited thickness profile which is based on the film property *of achieving a uniform thickness*." (Answer, pp. 9-10) (emphasis added). This is correct because, as Appellant has noted, Montcalm teaches using vapor or sputtering deposition primarily to form *optical films*. (Montcalm, col. 1, lines 34-40 and col. 4, lines 29-

40). Again, Appellant notes that this uniform thickness is desired for an *optical film*. (Montcalm, col. 1, lines 34-40 and col. 4, lines 29-40).

However, a deposition characteristic profile that merely produces an optical film limited to a uniform thickness is clearly inapplicable to the claimed method including "developing a deposition characteristic profile ... *based on pre-determined desired electrode properties*." (Emphasis added). Neither of the cited prior art references teach or suggest this subject matter.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. As demonstrated above, the scope and content of the prior art, as evidenced by Barnett and Montcalm, does not include or suggest "developing a deposition characteristic profile ... *based on pre-determined desired electrode properties*." (Emphasis added).

This difference between the claimed subject matter and prior art is tremendously significant because, as explained in Appellant's specification,

> the present method provides a way for thin film electrodes to be made with precise control of compositional and morphological gradients through the film thickness. Such films have superior volumetric energy (energy per 1 μm of thickness) as anode and cathode of SOFC. Stability of anode (cermet) to red-ox cycling is also improved due to the presence of "nano-chambers" connected by less porous material (in z-direction). As a result, thin-film SOFC performance may be up to 850 mW/cm² or higher. In addition, the thin-film architecture by definition requires less material than other solutions.

(Appellant's specification, paragraph 0038).

This method and these consequent advantages are not available from the cited prior art.

Consequently, claim 1 recites subject matter that is outside the scope and content of the cited prior art and which provides significant advantages not available to the prior art.

Therefore, Barnett and Montcalm will not support a rejection of claim 1 under § 103 and *Graham*. For at least these reasons, the rejection of claim 1 and its dependent claims should not be sustained.

(2) Claims 3 and 17 are patentable over Barnett, Montcalm and Tsai et al.:

Claim 3 recites "wherein forming said film further comprises varying a bias of said substrate to a deposited material." Claim 17 recites similar subject matter. Appellant has noted that claims 3 and 17 recite varying the bias of the substrate *during formation of a particular film* that is formed "in accordance with said deposition characteristic profile." (Claim 1).

In contrast, Tsai does not appear to teach or suggest, as recited in claims 3 and 17, varying a bias of a substrate during formation of a particular film that is formed "in accordance with said deposition characteristic profile." Rather, Tsai appears to teach varying the bias of the substrate between the formation of different films.

The Answer fails to address or respond to this argument that Tsai is not teaching the subject matter for which it was cited. (Answer, pp. 10-11). Consequently, one of skill in the art would learn from Tsai the varying of substrate bias with each new film, not during the formation of a particular film as recited in claims 3 and 17.

Consequently, claims 3 and 17 recite subject matter that is outside the scope and content of the cited prior art and which provides significant advantages not available to the prior art. Therefore, Barnett, Montcalm and Tsai will not support a rejection of claims 3 and 17 under § 103 and *Graham*. For at least these reasons, the rejection of claim 1 and its dependent claims should not be sustained.

(3) Claims 4 and 19 are patentable over Barnett, Montcalm and Ueda:

Claim 4 recites "wherein forming said film further comprises varying an applied magnetic field." Claim 19 recites similar subject matter. The Office Action concedes that Barnett and Montcalm fail to teach or suggest this subject matter. (Answer, p. 6). Consequently, the Action cites Ueda. (*Id.*).

Ueda teaches a "means of regulating magnetic flux density in a discharge atmosphere on a target of a magnetic body so as to enable stable magnetron discharge at all times" "[t]o successively obtain *homogenous thin film.*" (Ueda, abstract) (emphasis added). This is in complete contrast to Appellant's claimed method.

Appellant notes here that claim 1, from which 4 and 19 depend, recites "forming a film in accordance with [a] deposition characteristic profile" "based on pre-determined desired electrode properties." If a homogenous film would provide the desired electrode properties, there would be no point in "developing a deposition characteristic profile" or conducting deposition in accordance with such a profile.

Contrary to the teachings of Ueda, Appellant has disclosed and claimed a method for forming a film that is *not* homogenous. (*See* Appellant's specification, paragraph 0042). Consequently, the film formed in accordance with a deposition characteristic profile based on desired electrode properties is a *non-homogenous* film. Specifically, claim 4 recites "developing a deposition characteristic profile having at least one porous layer based on pre-determined desired electrode properties; and forming a film in accordance with said deposition characteristic profile" (claim 1) "wherein forming said film further comprises varying an applied magnetic field" (claim 4). Claim 19 recites similar subject matter.

In contrast, Ueda, which teaches varying an applied magnetic field to form a *homogenous* layer, actually teaches away from the claimed method of varying an applied

magnetic field to form a film in accordance with a deposition profile based on pre-determined desired electrode properties. Thus, scope and content of the cited prior art does not include the claimed the forming of a film by varying an applied magnetic field where the film is formed in accordance with a deposition characteristic profile based on desired electrode properties. Therefore, the rejection of claims 4 and 19 should not be sustained.

In view of the foregoing, it is submitted that the final rejection of the pending claims is improper and should not be sustained. Therefore, a reversal of the Rejection of May 18, 2007 is respectfully requested.

Respectfully submitted,

DATE: January 31, 2008

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